CLAIMS

What is claimed is:

1. An ablation probe, comprising:

an elongated shaft having a distal end;

an ablative element disposed on the distal end of the shaft; and

a lumen longitudinally extending within the shaft; and

a porous structure associated with the distal end of the shaft in fluid communication with the lumen, the porous structure having a porosity in the range of 20-80 percent.

2. The ablation probe of claim 1, wherein the porosity is in the range of 30-70 percent.

3. The ablation probe of claim 1, wherein the shaft is a rigid shaft.

4. The ablation probe of claim 1, wherein the porous structure is electrically conductive.

5. The ablation probe of claim 1, wherein the porous structure is electrically conductive.

6. The ablation probe of claim 1, wherein the porous structure has pores with effective diameters in the range of 1-50 microns.

7. The ablation probe of claim 1, wherein the porous structure has interconnecting pores.

8. The ablation probe of claim 1, wherein the entirety of the shaft is composed of the porous structure.

9. The ablation probe of claim 1, wherein the ablative element comprises at least one electrode.

10. The ablation probe of claim 1, further comprising a connector assembly mounted to a proximal end of the shaft, wherein the connector assembly comprises a port in fluid communication with the lumen.

11. An ablation probe, comprising:

an elongated shaft having a distal end;

an ablative element disposed on the distal end of the shaft; and

a lumen longitudinally extending within the shaft; and

a microporous structure associated with the distal end of the shaft in fluid communication with the lumen.

12. The ablation probe of claim 11, wherein the shaft is a rigid shaft.

13. The ablation probe of claim 11, wherein the microporous structure is electrically conductive.

14. The ablation probe of claim 11, wherein the microporous structure has interconnecting pores.

15. The ablation probe of claim 11, wherein the ablative element is composed of the microporous structure.

16. The ablation probe of claim 11, wherein the ablative element comprises at least one electrode.

17. The ablation probe of claim 11, wherein the microporous structure is electrically conductive.

18. The ablation probe of claim 11, further comprising a connector assembly mounted to a proximal end of the shaft, wherein the connector assembly comprises a port in fluid communication with the lumen.

19. An ablation probe, comprising:

an elongated shaft having a distal end;

an ablative element disposed on the distal end of the shaft; and

a lumen longitudinally extending within the shaft; and

a porous structure associated with the distal end of the shaft in fluid communication with the lumen, the porous structure having interconnecting pores.

20. The ablation probe of claim 19, wherein the pores are interconnected in a random arrangement.

21. The ablation probe of claim 19, wherein the shaft is a rigid shaft.

22. The ablation probe of claim 19, wherein the porous structure is electrically conductive.

23. The ablation probe of claim 19, wherein the ablative element is composed of the porous structure.

24. The ablation probe of claim 19, wherein the ablative element comprises at least one electrode.

25. The ablation probe of claim 19, further comprising a connector assembly mounted to a proximal end of the shaft, wherein the connector assembly comprises a port in fluid communication with the lumen.

26. A tissue ablation system, comprising:

an ablation probe having an ablative element and a perfusion lumen, at least a portion of the ablation probe being composed of a porous structure in fluid communication with the perfusion lumen, the porous structure having a porosity in the range of 20-80 percent;

an ablation source operably coupled to the ablative element; and

an fluid source operably coupled to the perfusion lumen.

27. The tissue ablation system of claim 26, wherein the porosity is in the range of 30-70 percent.

28. The tissue ablation system of claim 26, wherein the porous structure is electrically conductive.

29. The tissue ablation system of claim 26, wherein the porous structure has pores with effective diameters in the range of 1-50 microns.

30. The tissue ablation system of claim 26, wherein the porous structure has interconnecting pores.

31. The tissue ablation system of claim 26, wherein the ablation probe is a surgical probe.

32. The tissue ablation system of claim 26, wherein the ablative element comprises at least one electrode.

33. The tissue ablation system of claim 26, wherein the ablation source is an radio frequency (RF) ablation source.

34. The tissue ablation system of claim 26, further comprising a pump assembly for pumping fluid from the fluid source and through the perfusion lumen of the ablation probe.

35. A tissue ablation system, comprising:

an ablation probe having an ablative element and a perfusion lumen, at least a portion of the ablation probe being composed of a microporous structure in fluid communication with the perfusion lumen;

an ablation source operably coupled to the ablative element; and

an fluid source operably coupled to the perfusion lumen.

36. The tissue ablation system of claim 35, wherein the porous structure has interconnecting pores.

37. The tissue ablation system of claim 35, wherein the ablation probe is a surgical probe.

38. The tissue ablation system of claim 35, wherein the ablative element comprises at least one electrode.

39. The tissue ablation system of claim 35, wherein the ablation source is an radio frequency (RF) ablation source.

40. The tissue ablation system of claim 35, further comprising a pump assembly for pumping fluid from the fluid source and through the perfusion lumen of the ablation probe.

41. A tissue ablation system, comprising:

an ablation probe having an ablative element and a perfusion lumen, at least a portion of the ablation probe being composed of a porous structure in fluid communication with the perfusion lumen, the porous structure having interconnecting pores;

an ablation source operably coupled to the ablative element; and

an fluid source operably coupled to the perfusion lumen.

42. The tissue ablation system of claim 41, wherein the pores are interconnecting in a random arrangement.

43. The tissue ablation system of claim 41, wherein the ablation probe is a surgical probe.

44. The tissue ablation system of claim 41, wherein the ablative element comprises at least one electrode.

45. The tissue ablation system of claim 41, wherein the ablation source is an radio frequency (RF) ablation source.

46. The tissue ablation system of claim 41, further comprising a pump assembly for pumping fluid from the fluid source and through the perfusion lumen of the ablation probe.

47. A method of assembling an ablation probe, comprising:

shaping a mass of particles into an elongated shaft;

sintering the shaped particles to form a porous structure within the shaft;

forming a longitudinal lumen within the shaft; and

forming an ablative element on a distal end of the shaft.

48. The method of claim 47, wherein the lumen is formed when the mass of particles is shaped into the shaft.

49. The method of claim 47, wherein the at least one needle is formed when the mass of particles is shaped into the shaft.

50. The method of claim 47, wherein the mass of particles is shaped by compacting the particles within a mold.

51. The method of claim 47, wherein the shaft is a rigid shaft.

52. The method of claim 47, wherein the particles are electrically conductive.

53. The method of claim 47, wherein the particles are powder.

54. The method of claim 47, wherein the ablative element comprises at least one electrode.

55. The method of claim 47, further comprising co-extruding a sleeve around the shaft.

56. The method of claim 47, further comprising mounting a connector assembly to a proximal end of the shaft, wherein the connector assembly comprises a port in fluid communication with the lumen.